

Claims

What is claimed is:

1. A radiation detackifiable, thermally stable adhesive composition comprising:

a (meth)acrylate copolymer comprising from 85 wt. % to 97.5 wt. % of a (meth)acrylate ester and from 2.5 wt. % to 15 wt. % of a copolymerizable carboxylate monomer;

a multi-functional urethane acrylate oligomer combined with said (meth)acrylate copolymer to provide from 25 parts to 40 parts of said oligomer per 100 parts of said copolymer; and

a thermally stable free radical initiator to conserve adhesive properties at temperatures from about 115°C to about 155°C, said adhesive composition becoming progressively detackified during exposure to ultraviolet radiation.

2. A radiation detackifiable, thermally stable adhesive according to claim 1, wherein said thermally stable free radical initiator comprises 1-benzoyl cyclohexanol.

3. A radiation detackifiable, thermally stable adhesive composition according to claim 1, wherein said (meth)acrylate ester is selected from the group consisting of methyl acrylate, ethyl acrylate, propyl acrylate, n-butyl acrylate, isobutyl acrylate, 2-methylbutyl acrylate, 2-ethylhexyl acrylate, 2-ethylhexyl methacrylate, n-octyl acrylate, n-octyl methacrylate, isooctyl acrylate, isooctyl methacrylate, isononyl acrylate, isodecyl acrylate, isobornyl acrylate, vinyl acetate and mixtures thereof.

4. A radiation detackifiable, thermally stable adhesive composition according to claim 1, wherein said copolymerizable carboxylate monomer is selected from the group consisting of acrylic acid, methacrylic acid, beta-carboxyethyl acrylate, itaconic acid, crotonic acid, and fumaric acid.

5. A radiation detackifiable, thermally stable adhesive composition according to claim 1, wherein said multi-functional urethane acrylate is an aliphatic urethane acrylate oligomer.

6. A radiation detackifiable, thermally stable adhesive composition according to claim 1, wherein said multi-functional urethane acrylate is an aromatic urethane acrylate oligomer.

7. A radiation detackifiable, thermally stable adhesive composition according to claim 6, wherein said multi-functional urethane acrylate is a hexafunctional aromatic urethane acrylate oligomer.

8. A clear adhesive coated sheet for supporting a silicon wafer during manufacture of semiconductor micro-chips at elevated temperature, said coated sheet comprising:

a transparent film substrate;

a radiation detackifiable, thermally stable adhesive composition comprising:

a (meth)acrylate copolymer comprising from 85 wt. % to 97.5 wt. % of a (meth)acrylate ester and from 2.5 wt. % to 15 wt. % of a copolymerizable carboxylate monomer;

a multi-functional urethane acrylate oligomer combined with said (meth)acrylate copolymer to provide from 25 parts to 40 parts of said oligomer per 100 parts of said copolymer; and

a thermally stable free radical initiator to conserve adhesive properties at temperatures from about 115°C to about 155°C, said adhesive composition becoming progressively detackified during exposure to ultraviolet radiation.

9. A clear adhesive coated sheet according to claim 8, wherein said thermally stable free radical initiator comprises 1-benzoylcyclohexanol.

10. A clear adhesive coated sheet according to claim 8, wherein said adhesive sheet has an initial 180° peel adhesion from stainless steel from about 200g/25mm to about 2,500/25mm, said 180° peel adhesion falling to between about 25g/25mm to about

300g/25mm after exposure of said coated sheet to about 400 mJ/cm² radiation from a medium pressure mercury arc lamp said coated sheet having a haze level of less than 8, before and after exposure to radiation, as measured using a BYK Gardner HAZEGARD XL-211 tester.

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11. A clear adhesive coated sheet according to claim 10, wherein said adhesive sheet has an initial 180° peel adhesion from stainless steel from about 200g/25mm to about 2,500/25mm, said 180° peel adhesion falling to between about 25g/25mm and about 200g/25mm after exposure of said coated sheet to about 400 mJ/cm² radiation from a medium pressure mercury arc lamp.

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12. A clear adhesive coated sheet according to claim 8, wherein said (meth)acrylate ester is selected from the group consisting of methyl acrylate, ethyl acrylate, propyl acrylate, n-butyl acrylate, isobutyl acrylate, 2-methylbutyl acrylate, 2-ethylhexyl acrylate, 2-ethylhexyl methacrylate, n-octyl acrylate, n-octyl methacrylate, isooctyl acrylate, isooctyl methacrylate, isononyl acrylate, isodecyl acrylate, isobornyl acrylate, vinyl acetate and mixtures thereof.

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13. A clear adhesive coated sheet according to claim 8, wherein said copolymerizable carboxylate monomer is selected from the group consisting of acrylic acid, methacrylic acid, beta-carboxyethyl acrylate, itaconic acid, crotonic acid, and fumaric acid.

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14. A clear adhesive coated sheet according to claim 8, wherein said multi-functional urethane acrylate is an aliphatic urethane acrylate oligomer.

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15. A clear adhesive coated sheet according to claim 8, wherein said multi-functional urethane acrylate is an aromatic urethane acrylate oligomer.

16. A clear adhesive coated sheet according to claim 15, wherein said multi-functional urethane acrylate is hexafunctional aromatic urethane acrylate oligomer.

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